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Meaning of POROSITY

Pronunciation: pow'râsitee

WordNet Dictionary

Definition: [n] the property of being porous; being able to absorb fluids

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Synonyms: porousness

Antonyms: solidity, solidness

See Also: body, consistence, consistency, permeability, permeableness, sponginess

Webster's 1913 Dictionary

Definition: \Po*ros"i*ty\, n. [Cf. F. porosité.]

The quality or state of being porous; -- opposed to density.

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Porosity

- The sub-surface void space that holds groundwater is porosity
- the basic definition of porosity is the ratio of void space (volume) to total volume

$$n\% = 100 \cdot \frac{V_v}{V} = \frac{\text{void volume}}{\text{total volume}}$$

- In the laboratory soil/rock (effective) porosity is most simply determined by:
 1. measuring the original volume of sample
 2. drying the sample to remove unbound water
 3. submerging dried sample in a known volume of water until saturated
 4. the void volume (V_v) is the difference between the original water volume minus that remaining after the saturated sample is removed
- Total porosity is generally computed using:

$$n\% = 100 \cdot \left[1 - \frac{\rho_b}{\rho_d} \right]$$

- ρ_b is the bulk density of the solids (i.e. dried mass over original volume, often assumed to be 2650 $\frac{\text{kg}}{\text{m}^3}$)
- ρ_d is the particle density (dried mass over particle volume, determined by water displacement test)

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pore An opening or void within a rock or mass of rock, usually small and filled with fluid (water oil, gas, or all three). See porosity. Compare vug.

pore pressure Pressure exerted by fluids contained within the pores of rock. See formation pressure.

porosity The ratio of void space to the bulk volume of rock containing that void space. Porosity can be expressed as a fraction or percentage of pore volume in a volume of rock.

(1) Primary porosity refers to the porosity remaining after the sediments have been compacted but without considering changes resulting from subsequent chemical action or flow of waters through the sediments. See primary porosity.

(2) Secondary porosity is the additional porosity created by chemical changes, dissolution, dolomitization, fissures, and fractures. See secondary porosity.

(3) Effective porosity is the interconnected pore volume available to free fluids, excluding isolated pores and pore volume occupied by adsorbed water. In petroleum engineering practices, the term porosity usually means effective porosity.

(4) Total porosity is all void space in a rock and matrix whether effective or noneffective. Total porosity includes that porosity in isolated pores, adsorbed water on grain or particle surfaces, and associated with clays. It does not include water of crystallization wherein the water molecule becomes part of the crystal structure.

porosity exponent The exponent (m) of the porosity term in formation resistivity factor-porosity relationship. (See Archie's formulas.) The porosity exponent is influenced by those properties of the rigid rock which influence the shape of the electrically conductive solution occupying the pore volumes. Sometimes referred to as cementation factor and shape factor.

porosity overlay A log of porosity values computed from different logs plotted on top of each other.